Software Quality Assurance and Controls Standard

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Prescribed by ANSI Std Z39-18

Agenda

- What is Software Quality Assurance (SQA)?
- What is a Software Life Cycle (SLC) process?
- What is in a SQA Process?
- Where are SQA Controls?
- What is the SQA standards history?
- What is changing in SQA?
- What else is in the SQA standard?
- Where can you help?

What is SQA?
Where are SLC processes?

- The purpose of SQA is to provide assurance that work products and processes comply with predefined provisions and plans.

- According to International Standard (IS) 12207 – of the 44 system and software life cycle (SLC) processes, SQA is a support process with required outcomes, activities and tasks.
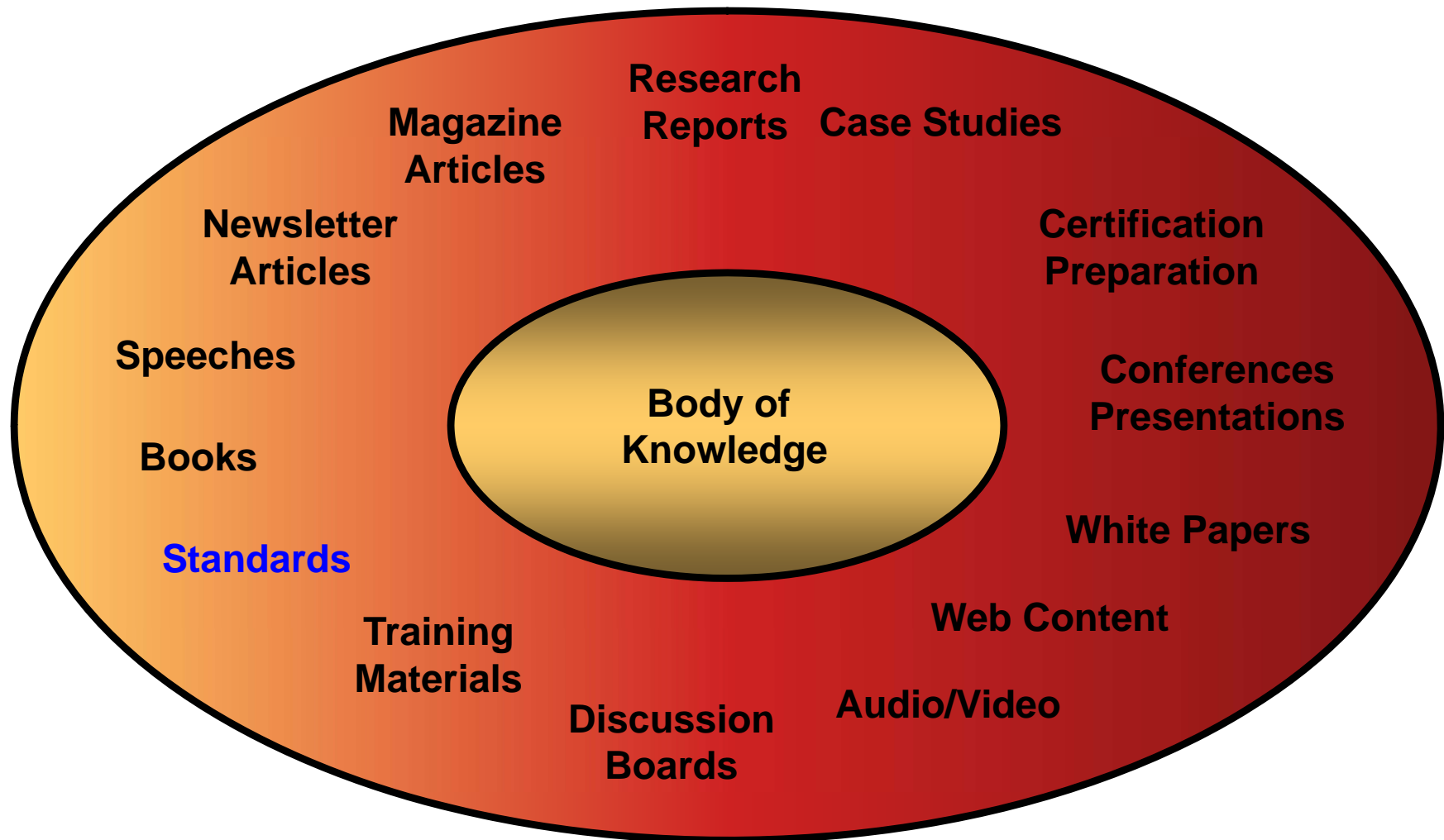
SQA Process Diagram
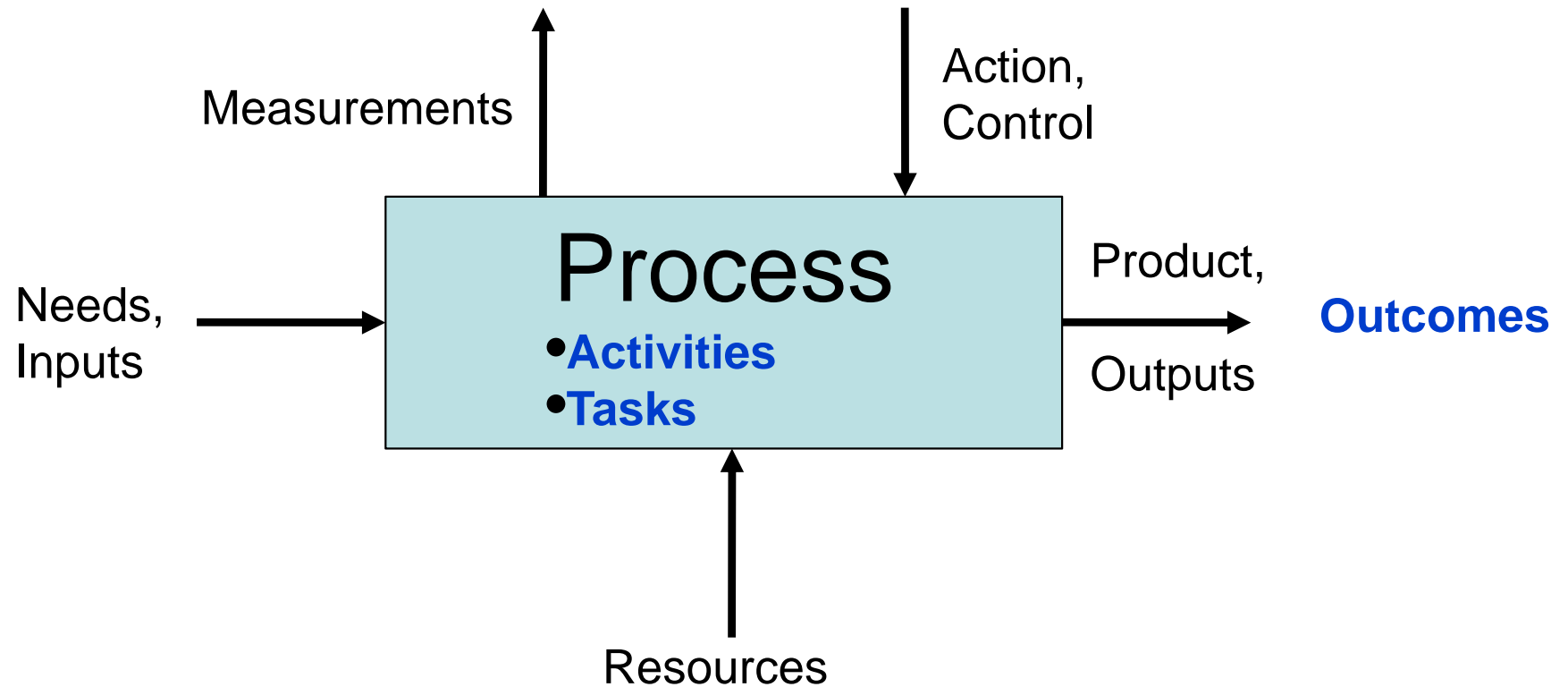
Process standards Approach

- Move from document (plan) focus to process focus

  - Alignment with framework standard IS 12207 software life cycle (SLC) processes with exact requirements and definitions

  - SQA outcomes are aligned with IS 15289 information products

  - Assimilate current best practices

Body of Knowledge

Research Reports

Magazine Articles

Case Studies

Newsletter Articles

Certification Preparation

Speeches

Body of Knowledge

Conferences Presentations

Books

Standards

White Papers

Training Materials

Web Content

Discussion Boards

Audio/Video

Standards aligned with Practice & Education

Generally Agreed Knowledge (SWEBOK Guide) and Practice Principles

Education	Professional Development	Practice

• **Curriculum** • **Accreditation Criteria**	• **Continuing Education** • **Certification**	**Standards of Practice**

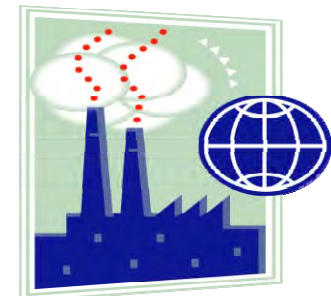| *IEEE/ACM Software Engineering 2004 curriculum* *ABET*	*Training Products* *Books and Publications* *Certified Software Development Professional*	*IEEE Software and Systems Engineering Standards* *ISO/IEC JTC1/SC7*

University acceptance

Individual acceptance

Industrial acceptance

SQA Relationship to ISO 9001

- **ISO 9001:2008 Quality Management Requirements**
  - Management ➔ Assurance ➔ Process Controls

- **IS 12207 SLC Processes**
  - Quality Management process➔ SQA process ➔ Controls in other SLC Processes

- **IEEE 730 SQA will plan, monitor, and participate in SLC Process controls**

  - **Examples SLC Process Controls:**
    - Audit: scope, report, corrective action sign-off
    - Configuration Management: Configuration control,
    - Review: notice, report, actions,
    - V&V: plan, report, corrective actions, report sign-off
    - Problem Resolution: Problem resolution sign-off

SQA relationship with other Life Cycle Processes
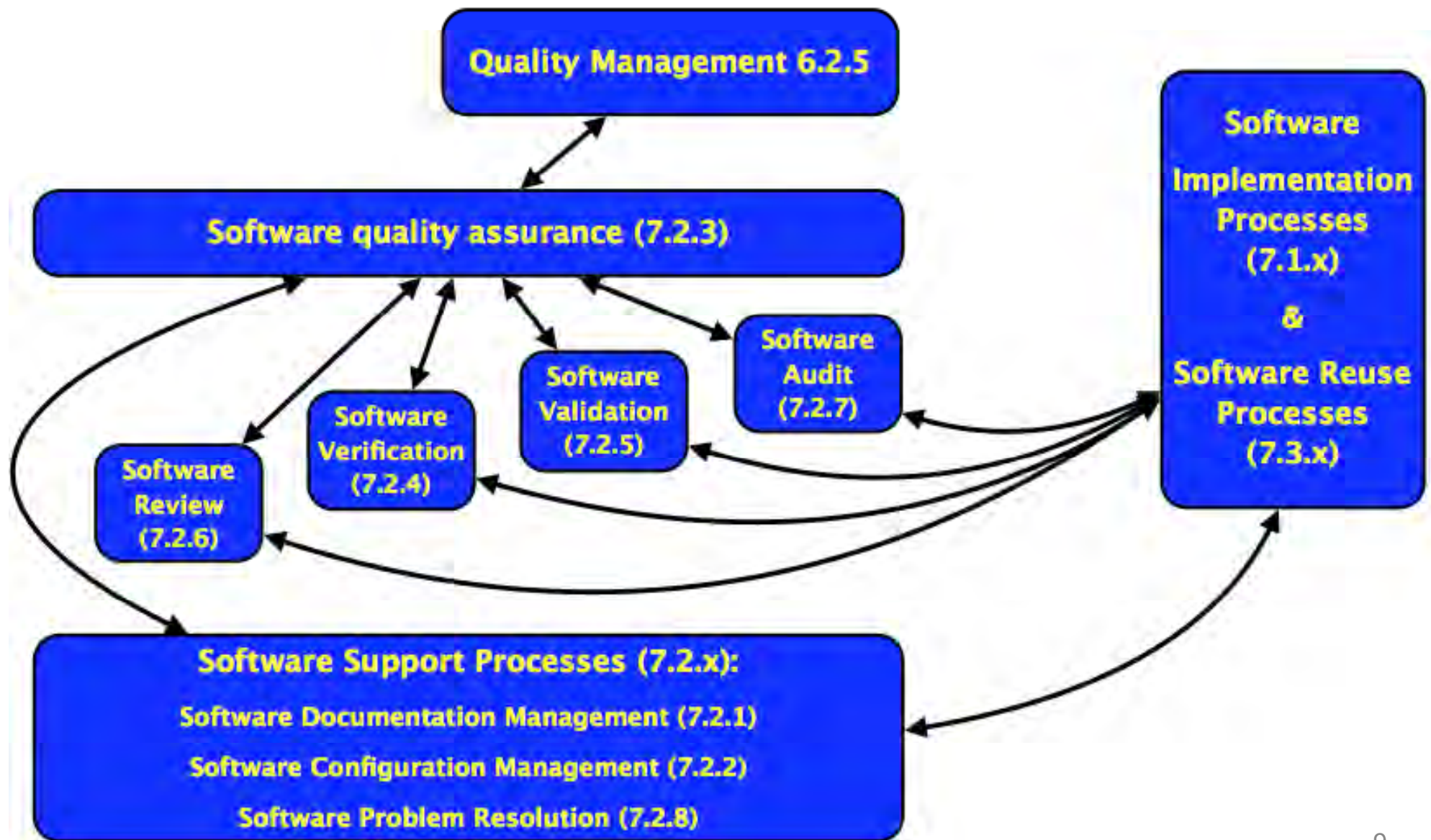
SQA & Life Cycle Standards History

Life Cycle Standard Event	Year	SQA Standard Event
	1979	SQAP Trial
	1981	SQAP Original
	1984	SQAP revised
	1986	SQAP Guide
	1989	SQAP revised
Software Life Cycle	1995	SQAP Guide
Software Life Cycle	1996	
Information Products	1997	
Software Life Cycle Implementation	1998	SQAP revised
System Life Cycle	2002	SQAP revised
System Life Cycle	2005	
Information Products	2006	
System Life Cycle	2007	
Software Life Cycle	2008	
Information Products	2011	SQA Process

What's New?

- IEEE 730 scope expanded to include all aspects of software quality assurance – not just the plan.

- Expand SQA to include all aspects of Software Quality Assurance process, as defined by IS 12207 and information (work) products (artifacts: documents and records) as defined by IS 15289

What's New? (2)

- Guidance to show conformance to related industry specific SQA standards e.g. audits, reviews, configuration management, verification, and validation

- Guidance to help new SQA practitioners understand the role of SQA in reviews, audits, V&V, SCM, document management, and problem resolution.

Inputs to P730

- Practitioner Experience
- SWEBOK
- Industry sector specific additions
- Software engineering tools e.g. RUP
- Case studies with best practices showing quantified business improvements

SQA Task Descriptions

- **Example from IS 12207 Task 7.2.3.3.2.1**
  - It shall be assured that all the plans required by the contract are documented, comply with the contract, are mutually consistent, and are being executed as required.

- **P730 5.2.1 will explain and have expanded content:**
  - What to do if there is not a contract
  - Many checks of a plan (plausible, specific, etc)
  - Track plan milestones

P730 SQA Outcomes - Example

IS 12207 Activity and Task 7.2.3.3.2.1	a) a strategy for conducting quality assurance is developed;	b) evidence of software quality assurance is produced and maintained;	c) problems and/or non-conformance with requirements are identified and recorded; and	d) adherence of products, processes and activities to the applicable standards, procedures and requirements are verified.
P730 5.2.1 Review plans for conformity and completion	SQA Plan	Quality Activity Record, QA sign-off	Problem Reports & Non-Conformances	Audit report, Quality Activity Record, QA sign-off on V&V report and Release Record

IEEE SQA Standard Outline

1. Overview (scope, purpose, field of application, limitations, conformance)
2. Normative references (IS 12207, IS 15289)
3. Definitions & terms
4. Application of the standard
5. SQA Process
   - Outcomes from IS 15289
   - Activities & Tasks from IS 12207
     - Process Implementation
     - Product Assurance
     - Process Assurance
     - Additional quality management activities

Outline (2)

6. Relationship with IS 12207 Support Processes
   - Software Documentation Management
   - Software Configuration Management
   - Software Verification
   - Software Validation
   - Software Review
   - Software Audit
   - Software Problem Resolution
   - Software Qualification Testing

Outline (3)

Annexes

- SQA Plan elements and associated SQA Activities & Tasks (normative)

- Goals and practices relationship to SQA outcomes, activities, & tasks (normative)

- All IS 12207 Software Life Cycle process Activities affected by SQA Activities & Tasks

- CMMI Development Product and Process Quality Assurance

  - Conformance support of PPQA Appraisal, Important Control Aspects of SQA

Outline (4)

- SQA tasks supporting in Agile Methods

- Support of SQA Organizations above IS 15504 Capability Level 2

- Practices Referenced by Certification Schemes

- Industry sector specific SQA requirements

Relationship of Software Audits and 12207 SLC

- Software Audit [example]
  - Perform planning activities for
    - Software Data Management
    - Software Configuration Management
    - Software Problem Resolution
  - Check Product artifacts in
    - Software Data Management
    - Software Configuration Management
  - Check Process artifacts in
    - Software Data Management
    - Software Configuration Management
    - Software Problem Resolution
  - Participate in Software Audit

Schedule

- P730 Standards Working group meetings continue throughout 2010
- IEEE Standards Association balloting P730 in 2011
- IEEE 730-2011 published

Future SQA user group 2011

- promote deployment
- promote & share best implementation practices
- link to key SQA training events
- link to key SQA Body of Knowledge
- link to certifications using SQA
- collect implementers change requests for next version

Where you can help?

- Attend a working group meeting in person or via LiveMeeting and phone, or

- Follow the working group progress, or

- Review the draft standard, or

- Ballot for the final standard!, or

- Participant in the User Group

- Send email to sue.carroll@sas.com and ask to be part of the listserv

Questions?

- Sue Carroll – sue.carroll@sas.com
- John Walz - johnwalz@ameritech.net
- P730 web portal - http://www.computer.org/portal/web/sqa

Acronyms

- Software Quality Assurance (SQA)

- Software Life Cycle (SLC)

- International Standard (IS)

- Software Engineering Body of Knowledge (SWEBOK)

- Software Quality Assurance Plan (SQAP)

- Rational Unified Process (RUP)

- Capability Maturity Model Integrated (CMMI)

- Process and Product Quality Assurance (PPQA)